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*The*  
**WALTHAM**  
**SPEEDOMETER**

*Manufactured and Guaranteed by the*

**WALTHAM**  
**WATCH**  
**COMPANY**  
Waltham, Mass.

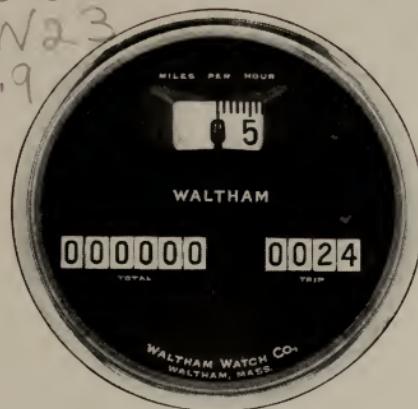


Wal. Ref.  
IND./W.W.Co./Box 1/ CAT 2/4  
681  
WAL



# Waltham Speedometer

RW  
681  
W23  
no. 9



Made in the largest watch  
factory in the world



Copyright, 1916

# THE WALTHAM SPEEDOMETER

*The only Speedometer Constructed to Watch Standards of Accuracy*

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**T**HE policy of leading automobile manufacturers is to perfect their product and supply equipment that will be high grade in every particular.

Dissatisfied, however, with the speed and distance recording instruments hitherto available, the car builder has been seeking the aid of a manufacturer of goods of quality and precision, one who could furnish him with a speedometer accurate, durable, attractive in appearance, and that would give satisfactory service under all conditions. Realizing this, the Waltham Watch Company has been developing, during the past three years, a high-grade speedometer, and is now placing it upon the market.

Its construction to Waltham standard of material and workmanship is a fact of prime importance which is fully appreciated by the public who are accustomed to purchase accessories of high grade. It is produced in conjunction with the complete line of Waltham watches and clocks, over twenty million of which have been sold in the past sixty years. It is guaranteed by the Waltham Watch Company whose name is known throughout the world and needs no further commendation.

The principle of the Waltham Speedometer is extremely simple, effective in performance and proof against unskilled handling. The instrument registers instantly all speed changes, including extreme low speeds. Neither vibration nor the extreme of heat, cold or altitude affects in any way its accuracy. The mechanism is not

complicated and so obviates at the start many difficulties inherent in other types of speedometers.

Special attention has been devoted to the flexible driving shaft, in the ordinary speedometer so great a source of trouble. Waltham speedometer shafts are built of interlocking links and collars of special nickel steel, heat treated, which afford the strongest, most dependable and yet flexible shaft ever supplied with a speedometer. Under severest road service, and laboratory tests involving running at 45 miles an hour for prolonged periods, this shaft has proved practically indestructible.

Even the smaller details show the refinement of Waltham progressiveness. By a quick reset device the trip odometer can be quickly reset to zero or to any mileage, a feature especially convenient for test trips or when touring with the Blue Book. The figures of the speed dial and odometer are readable not only from the driver's seat, but by the occupants of the tonneau.

Expert opinion of the Waltham Speedometer is shown by distinguished endorsement. The Packard Motor Car Co. have adopted the Waltham Speedometer for use on their magnificent cars. After rigid tests, conducted for more than a year by the engineering department, the Waltham was selected as standard equipment on Packards of the 1917 Series.

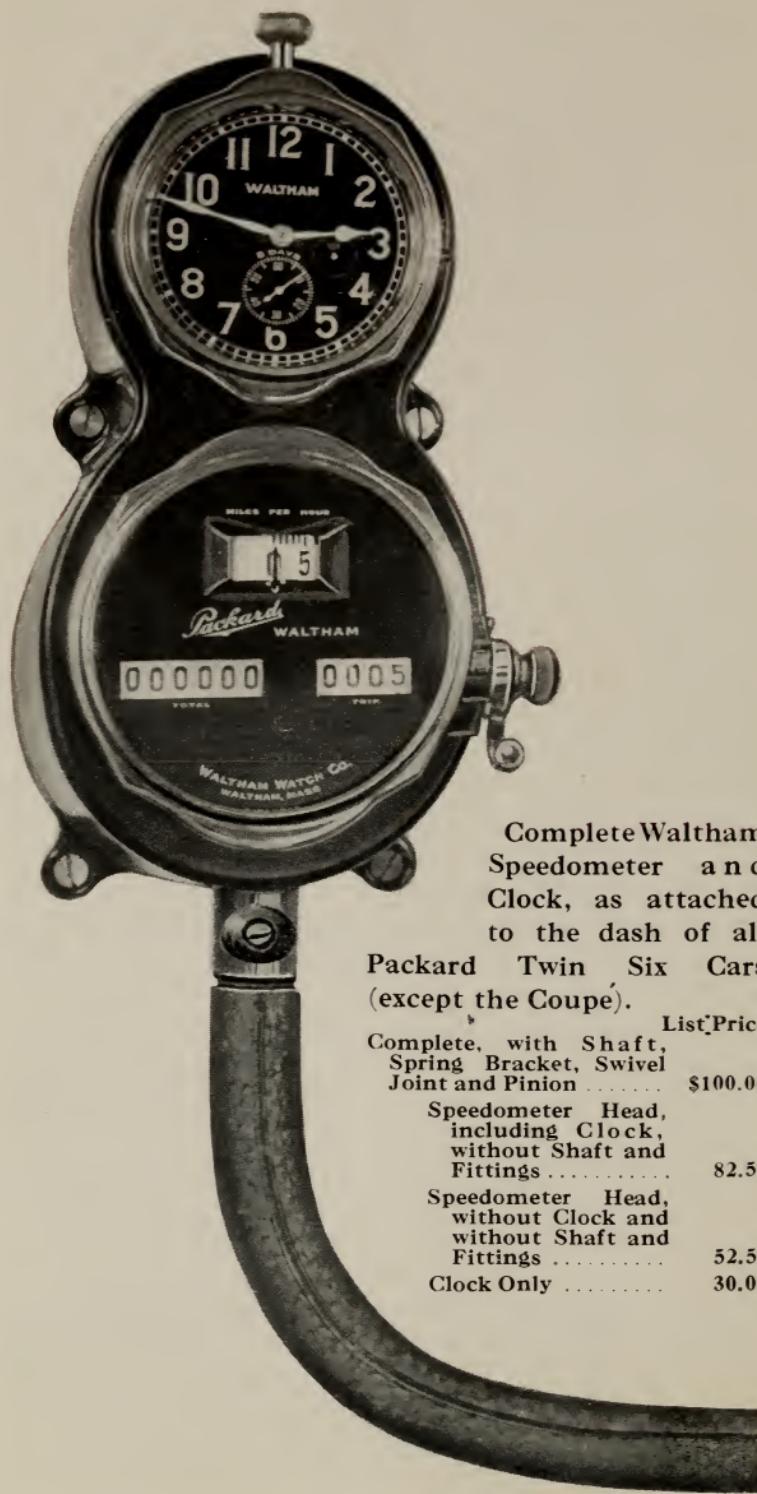
The manufacturer who equips with the Waltham Speedometer will find it as truly a "quality accessory for a quality car" as the Waltham Automobile Clock has proved to be.

A detailed description of the Waltham Speedometer will be found on succeeding pages.

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**WALTHAM WATCH COMPANY**  
**WALTHAM, MASS.**

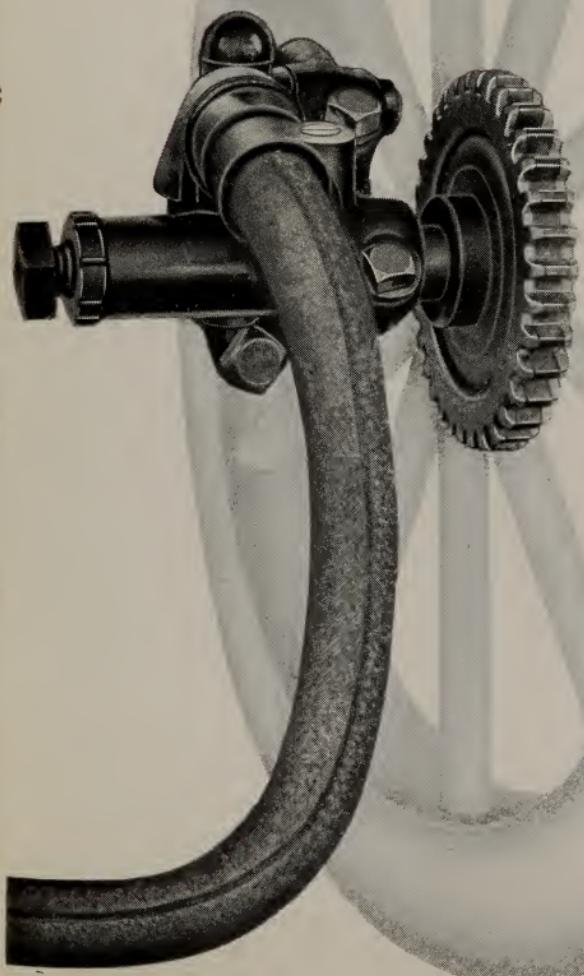
*The World's Acknowledged Leader in the Manufacture  
of Fine Timepieces*



Complete Waltham  
Speedometer and  
Clock, as attached  
to the dash of all  
Packard Twin Six Cars  
(except the Coupe).

	List Price
Complete, with Shaft, Spring Bracket, Swivel Joint and Pinion .....	\$100.00
Speedometer Head, including Clock, without Shaft and Fittings .....	82.50
Speedometer Head, without Clock and without Shaft and Fittings .....	52.50
Clock Only .....	30.00

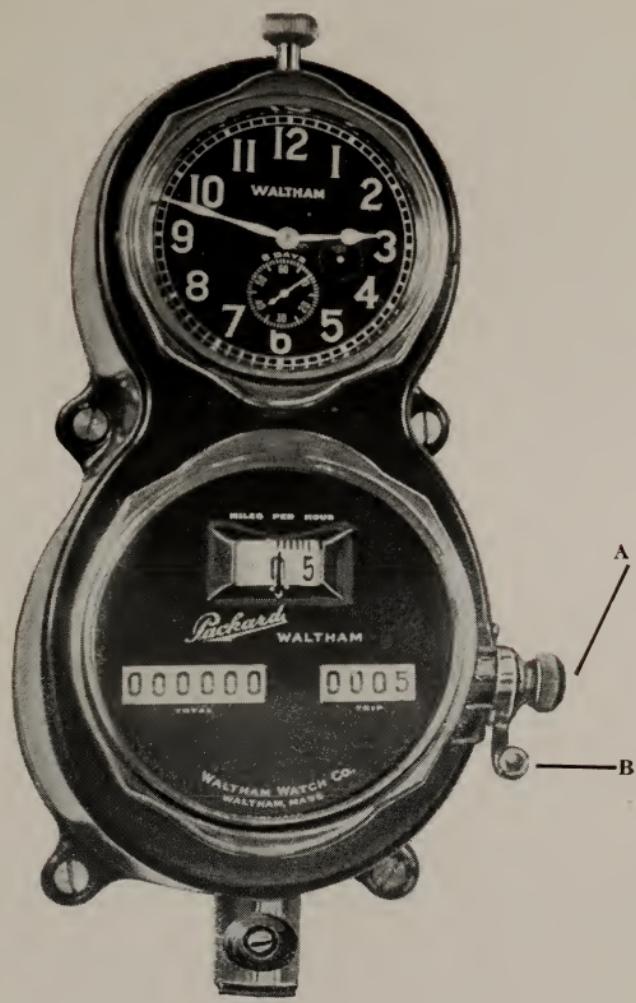
Special spring  
bracket, swivel  
joint and  
pinion com-  
plete, for front  
wheel installa-  
tion, show-  
ing flexible  
shaft cas-  
ing.





Special model Waltham Speedometer and Clock for Packard Coupés, equipped with electric light and adjustable dash bracket.

	List Price
Complete, with Shaft, Spring Bracket, Swivel Joint and Pinion.....	\$100.00
Speedometer Head, including Clock, without Shaft and Fittings .....	82.50
Speedometer Head, without Clock and without Shaft and Fittings .....	52.50
Clock Only .....	30.00



THE trip odometer can be set forward by simply turning the reset crown (A) forward. To set the odometer *backward* the reset lever (B) is held down and the odometer can then be set in either direction, forward or backward.

To set the trip odometer to zero quickly, turn the crown forward until the red figure (which is in tenths) corresponds with the figure next to it; then press the lever and set the odometer backwards or forwards until all zeros appear.

To set odometer when following a Blue Book route, the usual method of turning crown forward would apply if mileage is to be added. To subtract mileage proceed as follows:—If the mileage on trip odometer is forty-seven and six tenths (47.6) for example, and forty-seven and four tenths (47.4) is desired, first hold lever down and then turn crown backwards one tenth of a turn which will cause mileage to read forty-six and six tenths (46.6), then release lever and turn crown forward and forty-seven and four tenths (47.4) the desired mileage will quickly appear. The trip odometer can be quickly reset to any mileage without confusion if directions are followed.

**Do not try to turn odometer backwards without holding lever down**

THE speed-measuring part of the Waltham Speedometer consists of two essentials called cups, one inverted and telescoping the other, with an air gap separating them. The driving cup is driven by a flexible shaft from the road wheel or transmission system. The driven cup, known as the indicating one, is inverted outside the driving cup. It is the air friction generated in the annular air space between the cups which constitutes the speed measuring medium of the instrument.

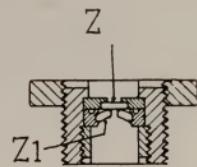
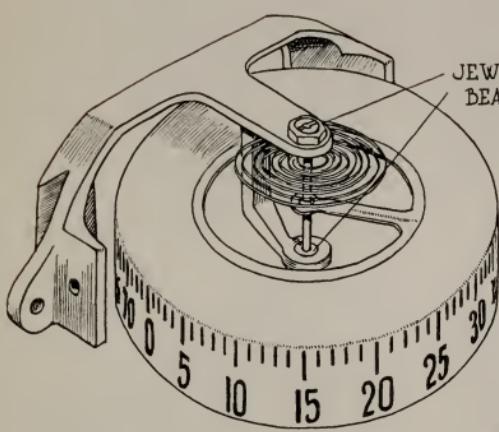
The relationship of these two cups is best shown on page 9. Each cup is in reality a double cup. Thus the revolving cup *K*, consists of two concentric brass cups, *K*1 and *K*2, having an annular space 0.108 cm. between the two vertical walls called ribs for convenience. The cups *K* and *K*1 are rigidly mounted on the vertical shaft *S* so that when one revolves both revolve.

The driven or indicating cup *C* consists of two aluminum cups *C*1 and *C*2 attached together so that to all intents and purposes they form a single cup. These cups are extremely light, being made of aluminum 8/1000 of a centimeter thick. This means that 313 of these cup thicknesses would be required to make 1 inch.

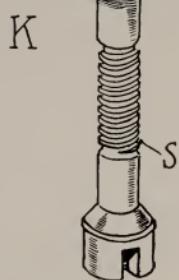
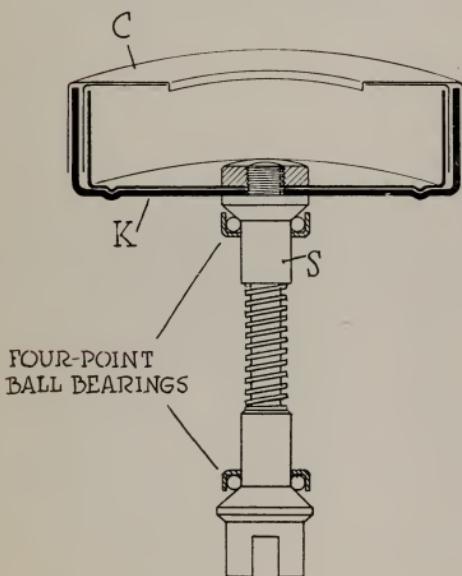
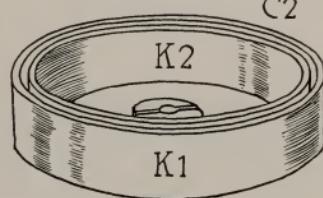
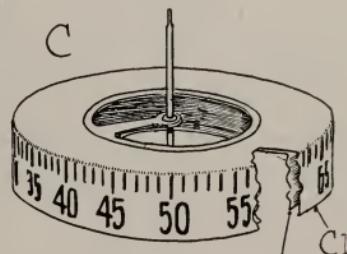
The aluminum cup *C* when in position in the instrument has the inner rib *C*2 floating in the annular space between the ribs *K*1 and *K*2 of the brass cup. The outer rib *C*1 of the aluminum cup floats outside of the brass rib *K*1. There is an air space at all times of one-half millimeter between the ribs of the brass and aluminum cups. On the outer face of the aluminum cup are the calibration figures to indicate the speed in miles per hour.

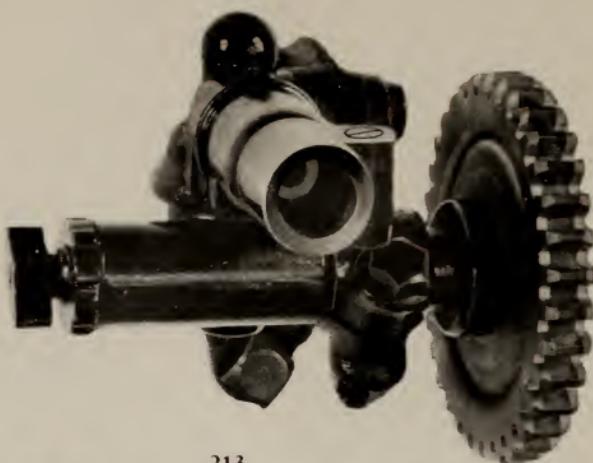
The revolving of the brass cup generates the air friction which would revolve the aluminum cup also were it not for a regulating hairspring shown in the upper left, page 9. This hairspring is so adjusted as to permit the correct oscillation of the indicating cup according to the speed. This regulation between the hairspring and the tendency to rotate is so accurate that the instrument indicates immediately all speed changes of the car.

The principle of air friction between revolving concentric cups has been proved to be directly in proportion to the speed of the revolving cup, in this case the driven brass cup. It is this fact that makes a uniform calibration possible without adding compensating devices to gain this end. The principle of indicating speed through air friction is covered by patents controlled by the Waltham Company. Comprehensive laboratory tests have proved that air friction is not influenced by heat, cold, or altitude up to 10,000 feet. The revolving cups do not have to be carried in an air-tight compartment, and no sealing is necessary.

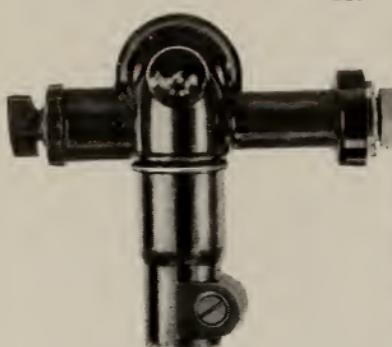


UPPER JEWEL BEARING  
(Enlarged Section)

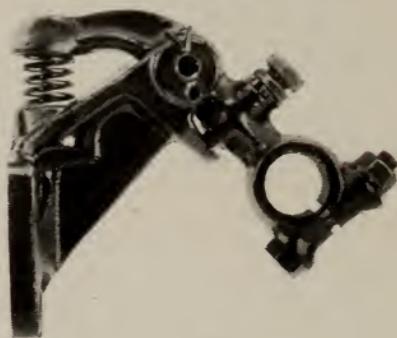




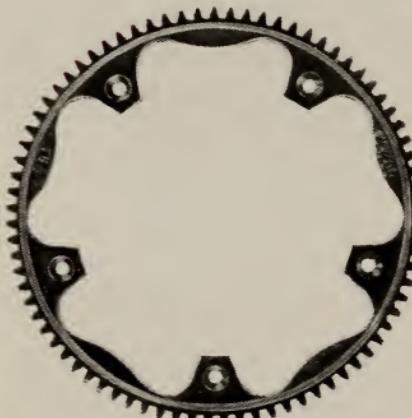
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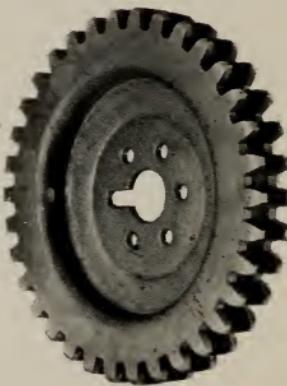
211



212



210-79 142-80



120

	List Price
213 SPRING BRACKET complete, with swivel joint and pinion	\$7.50
211 SWIVEL JOINT only	4.00
212 SPRING BRACKET	2.50
210-79 TOOTH WHEEL GEAR	1.50
142-80 TOOTH WHEEL GEAR	1.50
120 PINION	1.00



214



215

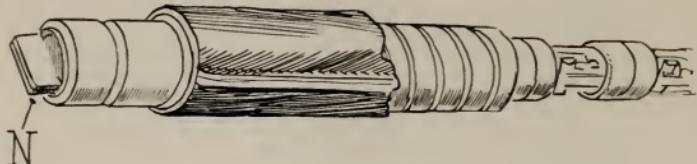


119



107

	List Price
214 LEATHER SHAFT Support .....	\$0.30
215 FLEXIBLE SHAFT, complete with casing and leather covering, 67 inches long. For Packard Coupe, 75 inches long .....	8.50
119 FLEXIBLE SHAFT CASING, leather covered, without shaft .....	4.50
107 FLEXIBLE DRIVING SHAFT.....	4.00



218



216



217

THE flexible shaft is made up of a series of interlocking links held in position by a series of steel collars so that it is impossible for the links to come apart. The chain is assembled from one end to the other and it is impossible to take it apart in the middle or at any other point except from either end. No rivets are employed in it, and it is such that it can be assembled or taken apart by an inexperienced workman without the aid of any tools and in a very short time. The only tool necessary in dismantling the chain is a pair of pliers to remove the locking male member (216) in the driving connection at either end. This done the entire linkage can be taken apart. All of the links are heat treated nickel steel stampings. The collars are of the same material. Surrounding the chain thus formed is the usual flexible casing with a leather cover.

## List Price

216 FLEXIBLE SHAFT DRIVING FORK AND SLEEVE, complete .....	\$0.50
217 FLEXIBLE SHAFT LINKS AND COLLARS, per foot .....	.75
218 FLEXIBLE SHAFT PARTS,—Fork, Sleeve, Links, Collars, Casing and Leather Cover.	

THE standard swivel joint on Packard cars and the wheel gears are designed for 35 x 5 Goodyear Cord tires on which a 79 tooth wheel gear and 34 tooth pinion is used. Experiments have taught us that Fabric tires of the same size are smaller, and where 35 x 5 Fabric tires are used a 35 tooth pinion must be used with the regular 79 tooth wheel gear. If 36 x 4½ Goodyear Cord tires are used it will be necessary to use 80 tooth wheel gear and 34 tooth pinion, and the same combination for a 37 x 5 Fabric tire. The 37 x 5 Goodyear Cord tire would require an 80 tooth wheel gear and a 33 tooth pinion.

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## NOTE

WHEN ordering flexible shaft casings, or flexible shafts complete, be sure and specify if they are for use on Coupés which require special lengths. The standard shaft length is 67 inches, but the Coupé model requires a shaft 75 inches in length.

## PRICE LIST

### *List Price*

PACKARD-WALTHAM Speedometer clock combination complete with all fittings for "225" and "235" Packard Twin Six cars .....	\$100.00
Speedometer Head, including Clock, without Shaft and Fittings .....	82.50
Speedometer Head, without Clock, Shaft and Fittings .....	52.50
Clock only .....	30.00

## PARTS

<i>Packard</i> No.	<i>Waltham</i> No.	<i>Description</i>	
	107	Flexible drive <i>shaft</i> complete without case .....	\$4.00
78326-78327	120	Pinion .....	1.00
	119	Flexible shaft casing (leather covered) .....	4.50
	210	Wheel gear, 79 tooth .....	1.50
	211	Swivel joint only, complete less pinion .....	4.00
55439-55444	212	Spring bracket only, complete .....	2.50
74369	213	Spring bracket complete with swivel joint and pinion .....	7.50
55418	214	Leather shaft support .....	.30
74370	215	Flexible shaft casing, leather covered, complete with flexible shaft .....	8.50
	216	Flexible shaft ends (forks and sleeve) .....	.50
	217	Flexible shaft links .....	.75

## GUARANTEE

"We will repair or replace, free of charge at our factory, or at any of our authorized Service Stations, any Waltham Speedometer or part that proves defective in material or workmanship within one year from date of sale to car buyer, provided transportation charges have been pre-paid. This guarantee does not cover fibre pinions.

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**WALTHAM WATCH COMPANY**

**WALTHAM, MASS.**

*Established in 1864*

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